Appl. No.: 10/709686
Amdt. Dated: 10/7/2006
Reply to Office action of: 08/02/2006

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

Claim 1 (currently amended) A controlled power transfer system in networks with sectors fed by two different batteries, applicable to automotive vehicles, with an architecture comprising at least a first battery (B1) and a second battery (B2) which can be charged from a generator (G), both batteries (B1, B2) being provided with a unit (CB1, CB2) integrating at least one control module (10, 11) of the state of charge and state of health (SOC, SOH) of said batteries (B1, B2) which feed respective networks (17, 18), a first one of them (17) integrating security and supervision or stand-by modules, and the second one (18) including at least one start up device, power being distributed to said networks (17, 18) from power distribution boxes (SDN1, SDN2, SDN3) which include a management microcontroller (1, 2, 3), and the system integrating a communications bus (19), characterized by also comprising a detection device (30) of a voltage, a ~~and/or~~ polarity level, or both, of an external supply susceptible to being connected on at least one of the posts of one of said batteries (B1 and B2), and controlled switching devices (33, 34) for routing said external power flow to a predetermined one of said two batteries (B1 or B2), and in that said power distribution boxes (SDN1, SDN2, SDN3) to the loads are interconnected and connected to said control units (CB1, CB2) of batteries B1, B2, for carrying out permanent monitoring of the state of health and state of charge of said two batteries (B1, B2) and providing controlled power transfer between the two batteries (B1, B2), at any time, even in a situation when the vehicle engine start up key is off, regardless of consumption required by the loads and in prevention of future demands.

Claim 2 (original) A system according to claim 1, characterized in that said switching devices (33, 34) are controlled by a microprocessor (32) receiving as input the voltage or polarity level in an auxiliary post (30a) intended for connection of said external power source.

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Claim 3 (currently amended) A system according to claim 1, characterized in that said two batteries (B1, B2) have differentiated voltage levels and in that each one of said power distribution boxes (SDN1, SDN2 and SDN3) includes a converter (25, 26, 27), at least one (25) of said converters being two-way and permitting said power transfer between said batteries (B1, B2) in either direction, according to the result of said monitoring of the state thereof.

Claim 4 (currently amended) A system according to claim 1, characterized in that it comprises three of said power distribution boxes (SDN1, SDN2, and SDN3), a first of them (SDN1) foreseen for feeding loads in the front area of the vehicle, a second one (SDN2) intended for supplying a central area thereof, and a third one (SDN3) applied for supplying power to a rear part of the vehicle.

Claim 5 (currently amended) A system according to claim 1, characterized in that it comprises three of said power distribution boxes (SDN1, SDN2 and SDN3), a first of them (SDN1) for feeding loads in the front area of the vehicle, a second one (SDN2) intended for supplying a central area thereof, and a third one (SDN3) foreseen for supplying power to a rear part of the vehicle, and in that the first of said boxes (SDN1) is fed by battery (B1) at a lower voltage level and includes said two-way converter (25) permitting feeding loads at said first voltage level and at a second, higher voltage level, the two remaining power distribution boxes (SDN2 and SDN3) being connected to battery (B2), at a higher voltage level, and each one of them integrating a one-way converter (26, 27) enabling power supply at said first lower voltage level.

Claim 6 (currently amended) A system according to claim 3, characterized in that said control unit (CB1, CB2) associated to each one of the batteries (B1, B2) comprises a power disconnection or (BCO) (Battery Cut Off) device (13, 14) applied to the automatic disconnection of the battery (B1, B2) from its network, in the case of an accident or due to instructions received from one of the microcontrollers of the distribution boxes (SDN1, SDN2, SDN3) or from the control unit (CB1, CB2).

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Claim 7 (currently amended) A system according to claim 6, characterized by integrating a user-accessible switch 13a, 14a for enabling or disabling said disconnection (BCO) devices (13, 14).

Claim 8 (currently amended) A power transfer control method in networks with sectors fed by two different batteries, applicable to automotive vehicles, with an architecture comprising at least a first battery (B1) and a second battery (B2) which can be charged from a generator (G), both batteries (B1, B2) being provided with a unit (CB1, CB2) integrating at least one control module (10, 11) of the state of charge and state of health (SOC, SOH) of said batteries (B1, B2) which feed respective networks (17, 18), a first one of them (17) integrating security and supervision or stand-by modules, and the second one (18) including at least one start up device, power being distributed to said networks (17, 18) from power distribution boxes (SDN1, SDN2, SDN3) which include a management microcontroller (1, 2, 3), and the system integrating a communications bus (19), characterized by carrying out permanent monitoring of the state of health (SOH) and state of charge (SOC) of each one of said two batteries (B1, B2) and of the voltage or polarity of the external supply susceptible to being connected to one of the posts of one of said batteries (B1, B2), and by carrying out an actuation by means of microcontrollers for ensuring a power transfer between said two batteries (B1, B2), at any time.

Claim 9 (currently amended) A method according to claim 7, characterized in that said two batteries (B1, B2) have differentiated voltage levels, and in that each one of said power distribution boxes (SDN1, SDN2, SDN3) includes a DC/DC converter (25, 26, 27), at least one (25) of said converters being two-way and carrying out said power transfer between said batteries (B1, B2) through said converter, in either direction, according to the result of said monitoring of the state thereof.

Claim 10 (currently amended) A method according to claim 8, characterized in that said control unit (CB1, CB2) associated to each one of the batteries (B1, B2) comprises a power disconnection or (BCO) (Battery Cut Off) device (13, 14) applied to the automatic disconnection of the battery (B1, B2) from its network (17, 18) in case of

an accident or due to instructions received from one of the microcontrollers of the distribution boxes (SDN1, SDN2, SDN3) or from the control unit (CB1, CB2), and in that said disconnection BCO devices (13, 14) are susceptible to manually enabling or disabling by means of a user-accessible switch (13a, 14a).

Claim 11 (currently amended) A method according to claim 10, characterized in that in the case of supplying battery (B2) at a higher voltage level from battery (B1), at a lower voltage level, it will be checked that the SOC/SOH of the 12 V battery (B1) is correct, and the discharge cycles of said battery (B1) will likewise be controlled.

Claim 12 (currently amended) A method according to claim 11, characterized in that in order to ensure the efficacy of charging battery (B2) at a higher voltage level, it is also ensured that battery (B1) at a lower voltage level does not supply power to the unnecessary loads, disconnecting for such purposes said loads through the corresponding disconnection BCO device (13).

Claim 13 (currently amended) A method according to claim 9, characterized in that said disconnection BCO device (13, 14) disconnects the batteries (B1, B2) from the networks which they are supplying, conserving the connection between said two batteries (B1, B2), except in the case of actuation of the BCO device (13, 14) due to an accident.

Claim 14 (currently amended) A system according to claim 3, characterized in that it comprises three of said power distribution boxes (SDN1, SDN2, and SDN3), a first of them (SDN1) foreseen for feeding loads in the front area of the vehicle, a second one (SDN2) intended for supplying a central area thereof, and a third one (SDN3) applied for supplying power to a rear part of the vehicle.

Claim 15 (currently amended) A system according to claim 3, characterized in that it comprises three of said power distribution boxes (SDN1, SDN2 and SDN3), a first of them (SDN1) for feeding loads in the front area of the vehicle, a second one (SDN2) intended for supplying a central area thereof, and a third one (SDN3) foreseen for

supplying power to a rear part of the vehicle, and in that the first of said boxes (SDN1) is fed by battery (B1) at a lower voltage level and includes said two-way converter (25) permitting feeding loads at said first voltage level and at a second, higher voltage level, the two remaining power distribution boxes (SDN2 and SDN3) being connected to battery (B2), at a higher voltage level, and each one of them integrating a one-way converter (26, 27) enabling power supply at said first lower voltage level.